
Multi-angle Imaging SpectroRadiometer



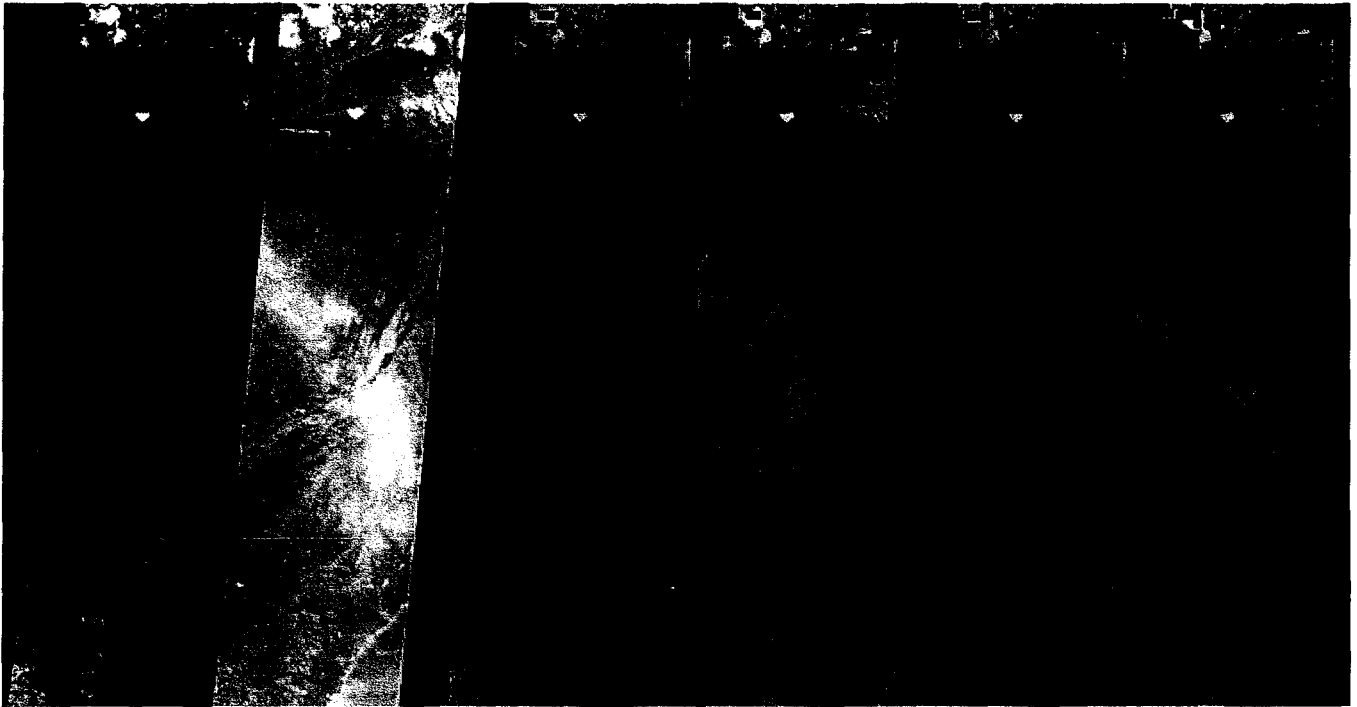
Retrieval of Radiometric and Biophysical Properties of Selected Surface Regions Using MISR Data

**John Martonchik, David Diner, Kathleen Crean, Michael Bull,
Yuri Knyazikhin, Jiannan Hu, and Ranga Myneni**

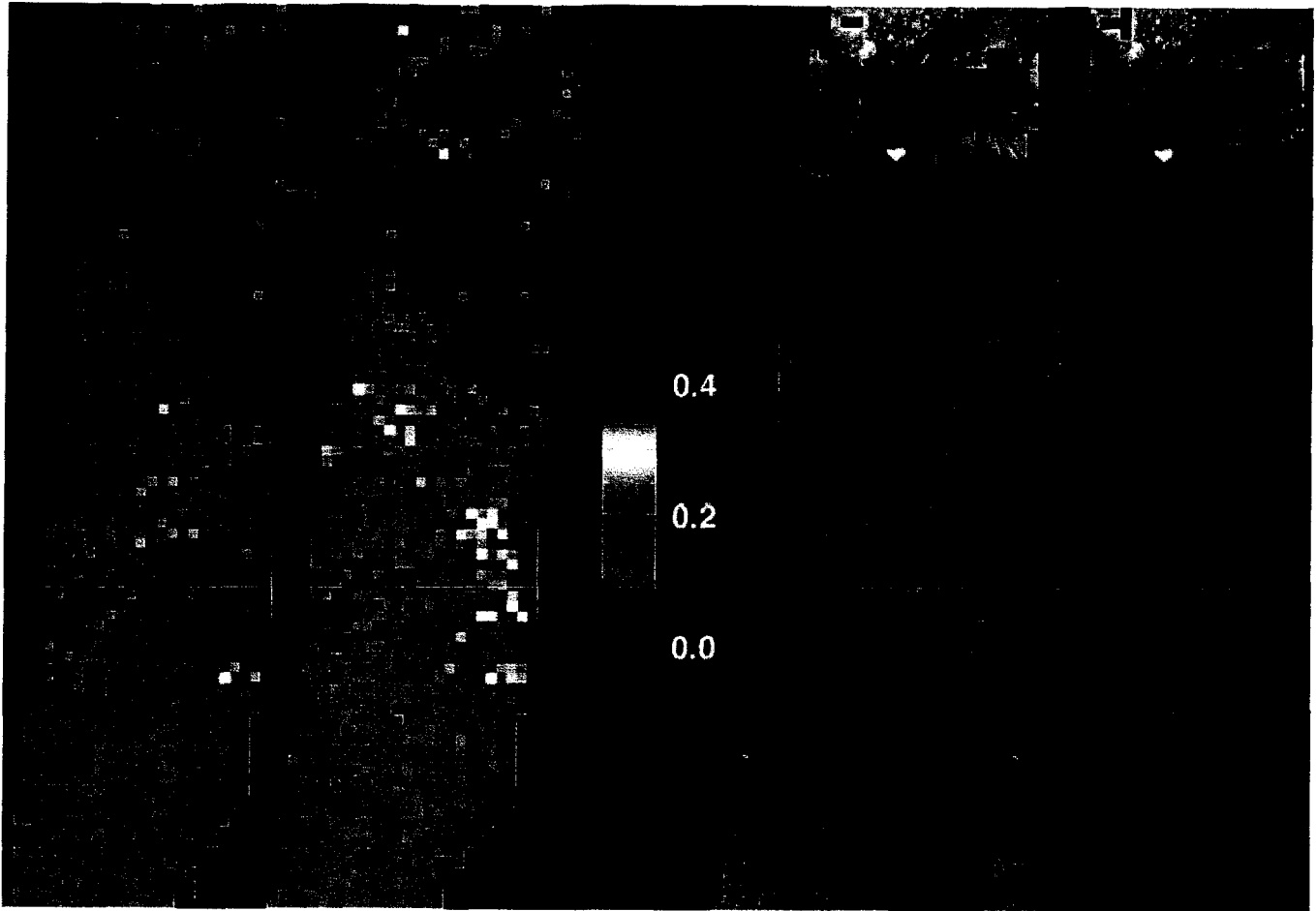
IGARSS, 24-28 June 2002, Toronto Canada



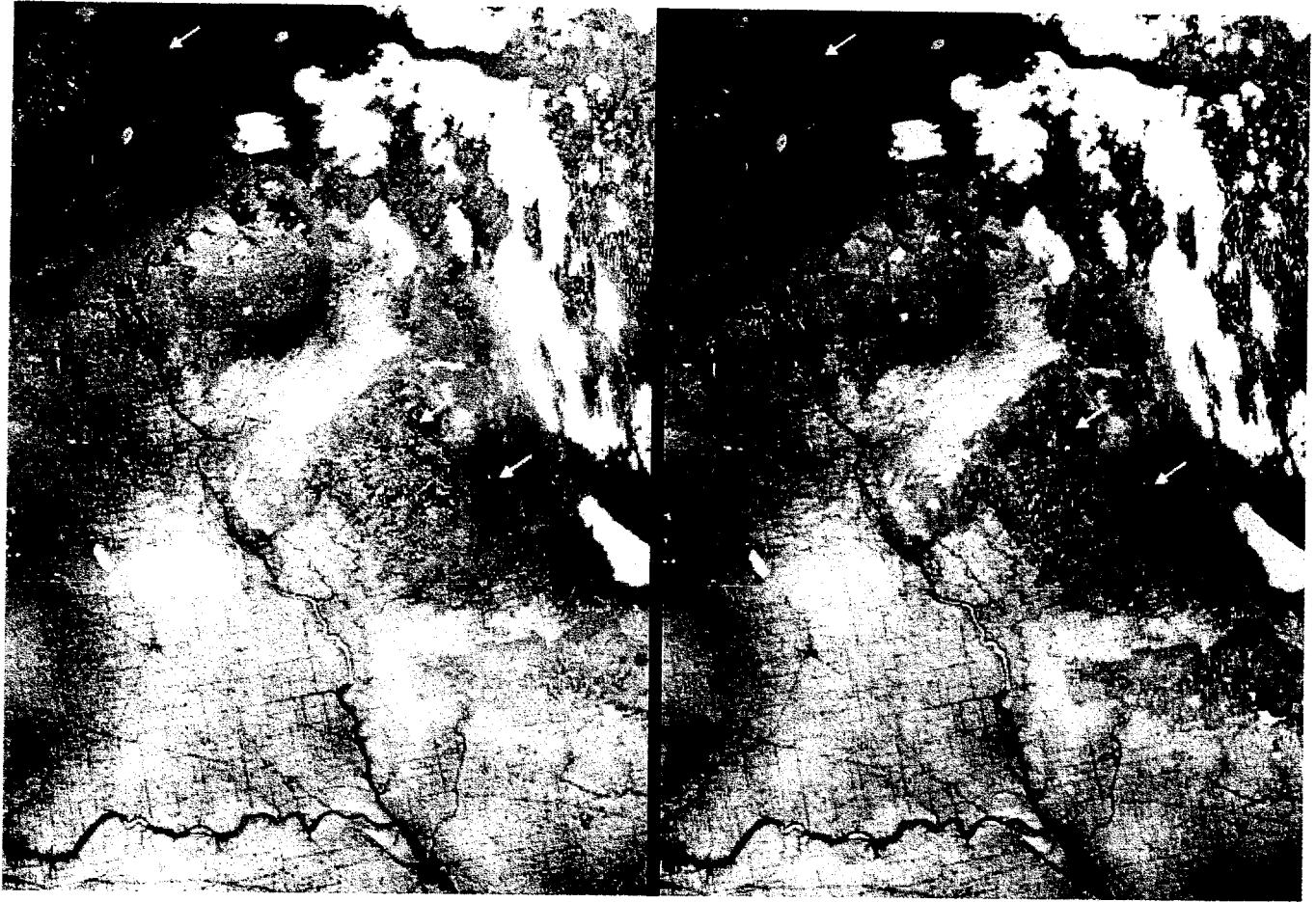
**Jet Propulsion Laboratory
California Institute of Technology**



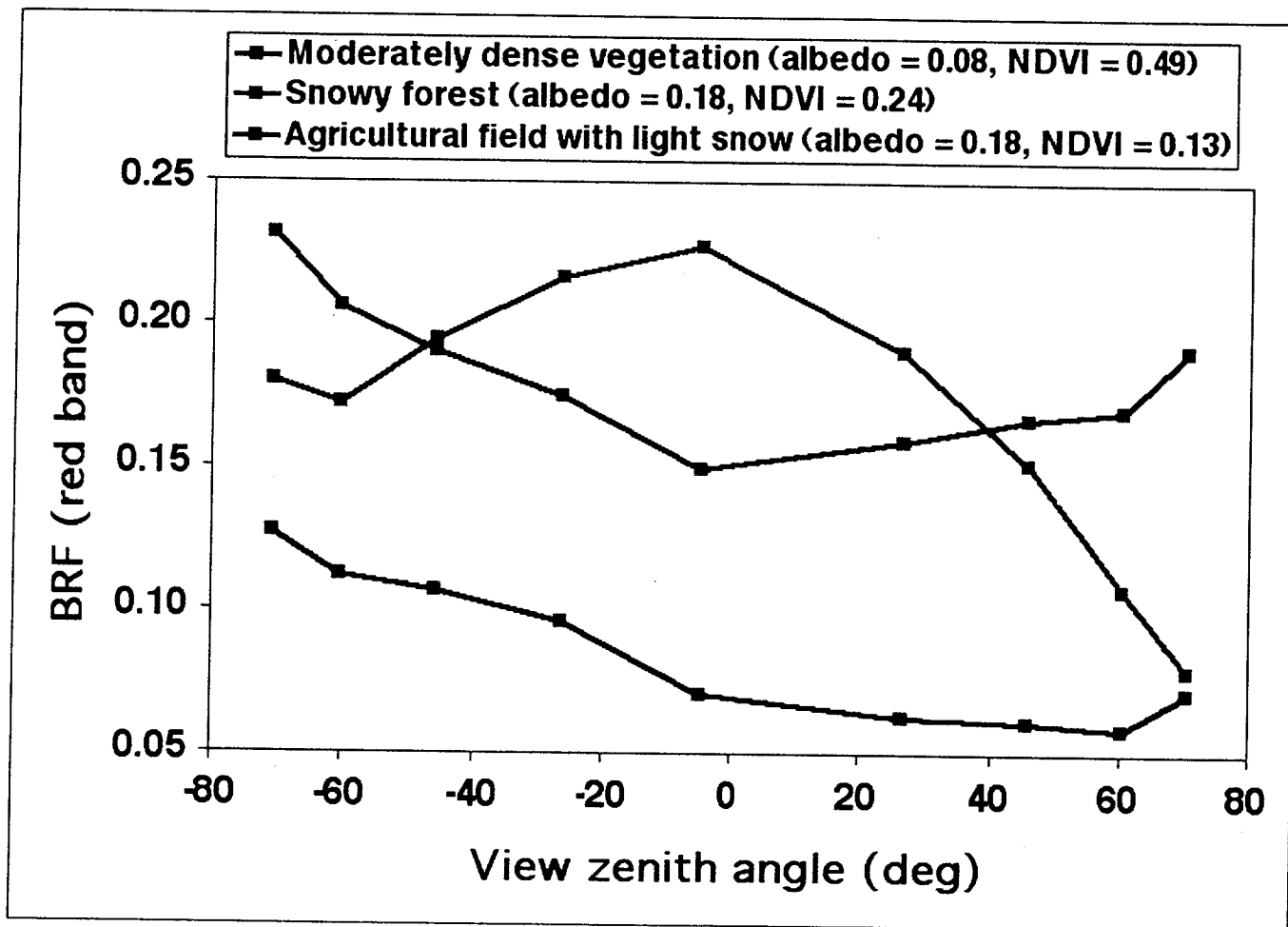
Late winter in eastern USA on 6 March 2000 (Path 17, Orbit 1155). Swath segments shown (from left to right) are: true-color TOA nadir view, TOA 70° forward view, true-color retrieved nadir view HDRF (V2.1.3 s/w), retrieved 70° forward view HDRF (V2.1.3 s/w), nadir view HDRF (V2.1.4 s/w), retrieved 70° forward view HDRF (V2.1.4 s/w).



Swath segment maps associated with Figure 1, show(left to right) are: retrieved aerosol optical depth (V2.1.3 s/w), retrieved aerosol optical depth (V2.1.4 s/w), true-color BHR (V2.1.3 s/w), and BHR (V2.1.4 s/w).



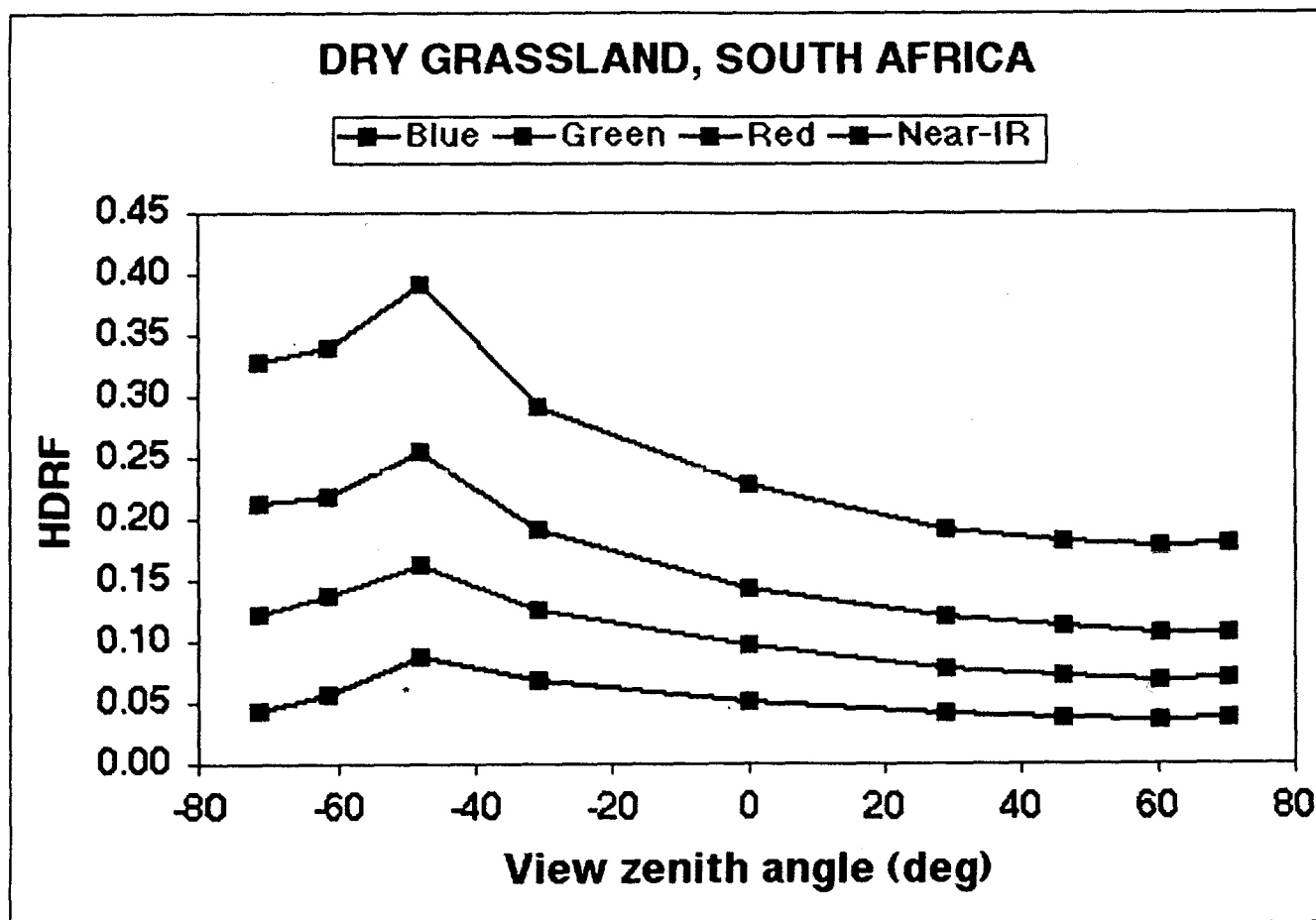
Two false-color images (275 m resolution) of an area (240 km x 175 km) in central Canada on 17 April 2001 (Path 34, Orbit 7083), centered on the Saskatchewan-Manitoba border. The left image is a multispectral composite in which red indicates vegetation. The image on the right is a multiangular composite in which green indicates predominant scattering in the nadir direction.



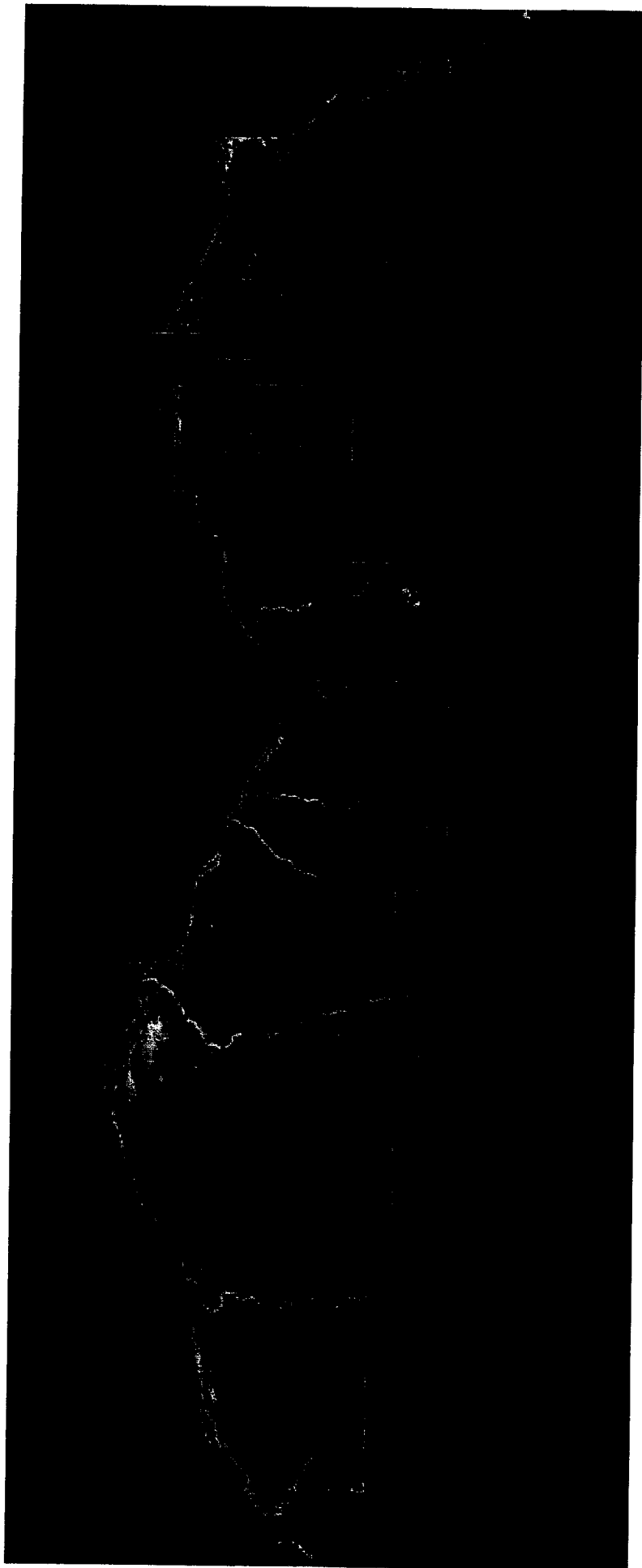
Angular variation of BRF for the three sites indicated by yellow arrows



True-color mosaic of DHR for southern Africa at 1.1 km resolution. The data were acquired from 14 August to 29 September 2000 during the dry season.



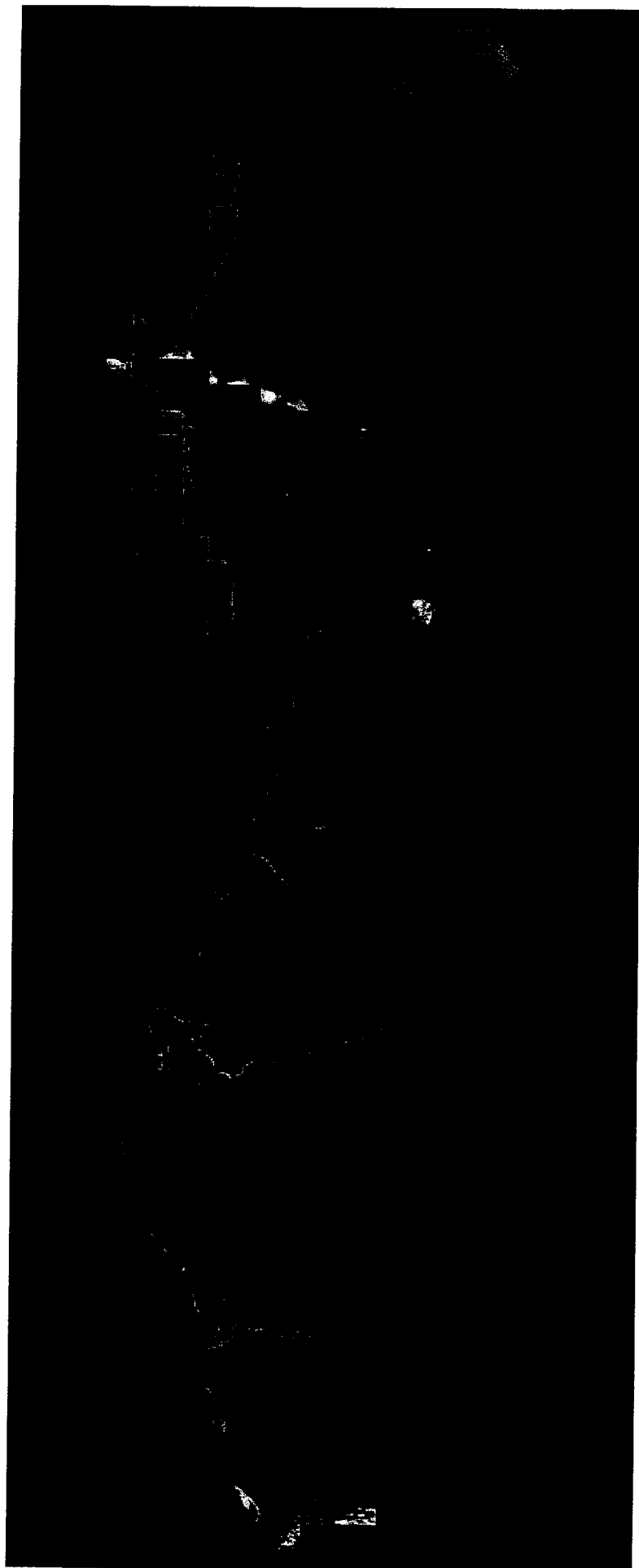
Spectral and angular variation of HDRF for dried grassland on 15 August 2000 (Path 168, Orbit 3509) for a site near Johannesburg. Note the hot spot at the view zenith backscatter angle of 49° , which is also the solar zenith angle.



W. 16. 11N

Map of true color surface HDRF at 1.1 km resolution from the MISR AN camera (view zenith angle over the land area in the range 4-17 deg).

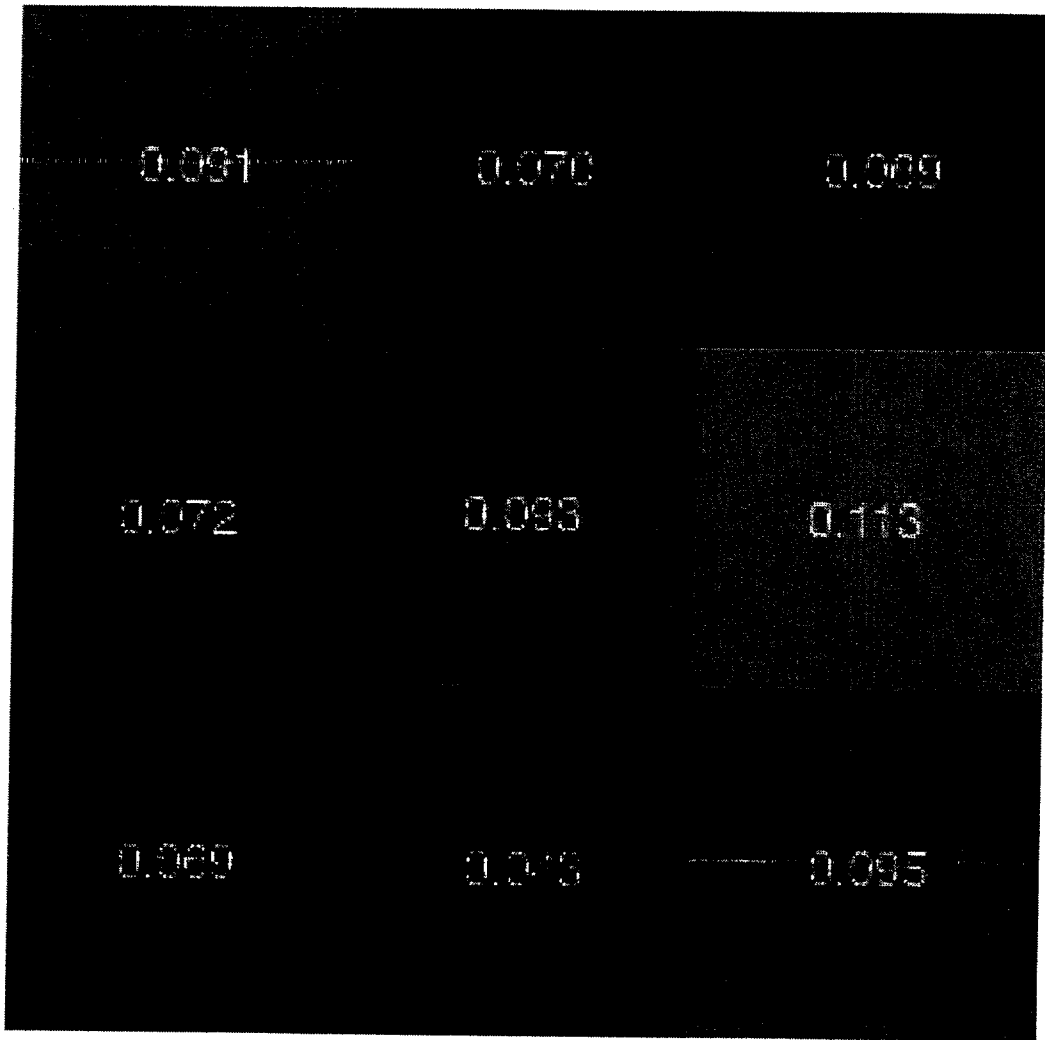
The Sun-camera azimuth angle difference over the land area is in the range 73-114 deg.



Map of true color surface HDRF at 1.1 km resolution from the MISR DA camera (view zenith angle is approximately 70 deg).

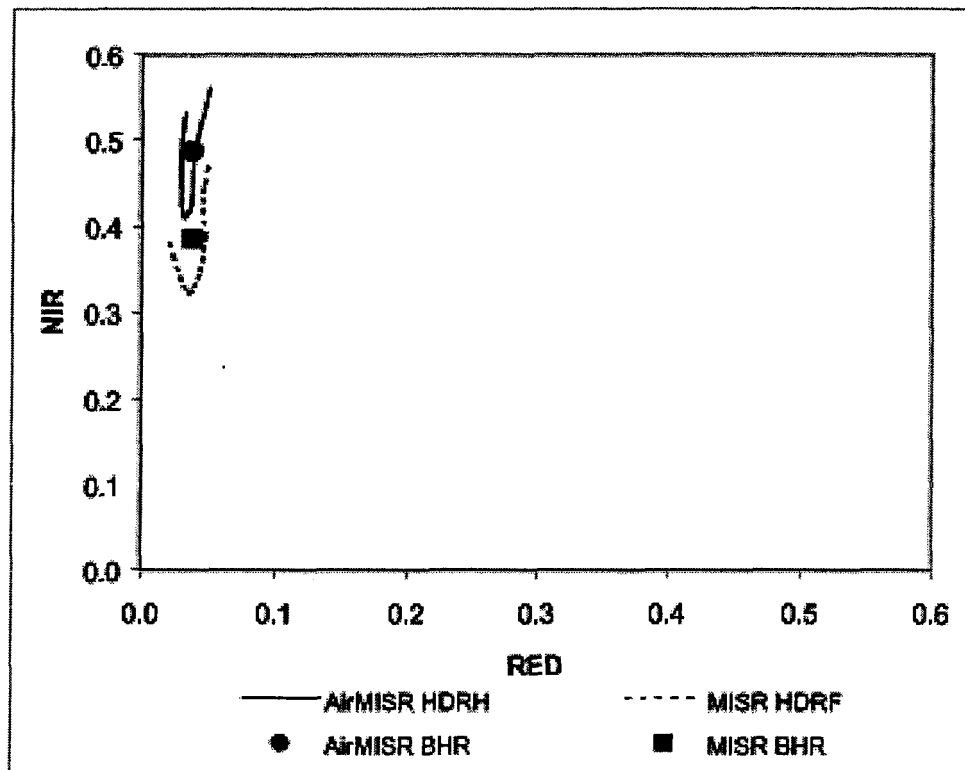
The Sun-camera azimuth angle difference over the land area is in the range 6-20 deg.

Compared to the AN camera map, this one shows a prominent "quilting" effect. This effect will always be most dramatic at the largest view zenith angles (D cameras). Outlined on the map in red is a 3 x 3 region area which shows a considerable amount of "quilting".

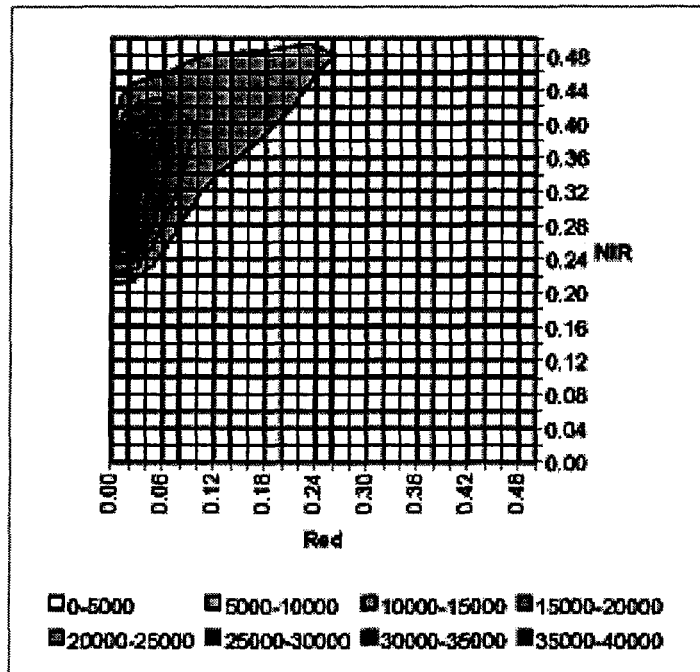


This 3 x 3 pattern (corresponding to the 3 x 3 region area contained with the red outline of the DA camera HDRF map) displays the retrieved aerosol optical depths (MISR green band) used in the atmospheric correction process to obtain the HDRFs.

These optical depths have an average and standard deviation of 0.079 +/- 0.021. Nevertheless, the variation is large enough to produce the "quilt" pattern which can be easily seen within the red outline on the DA camera HDRF map.

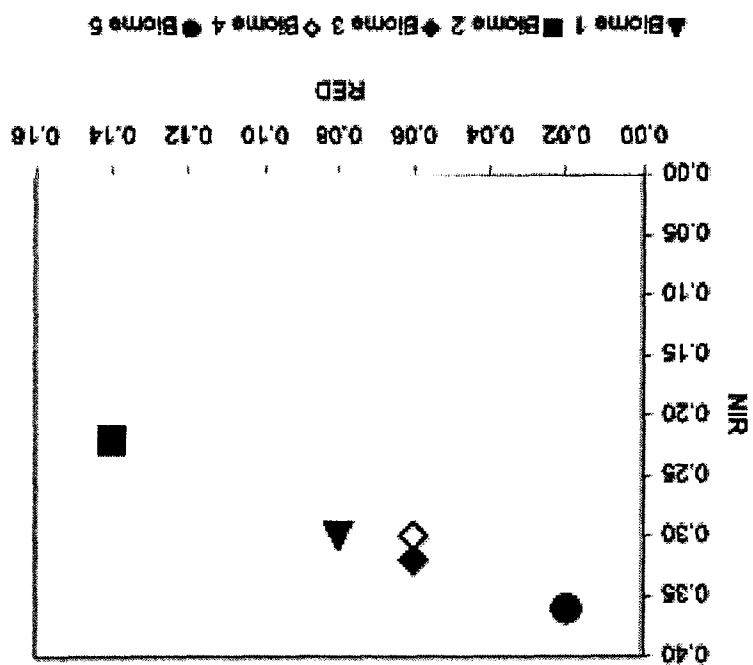


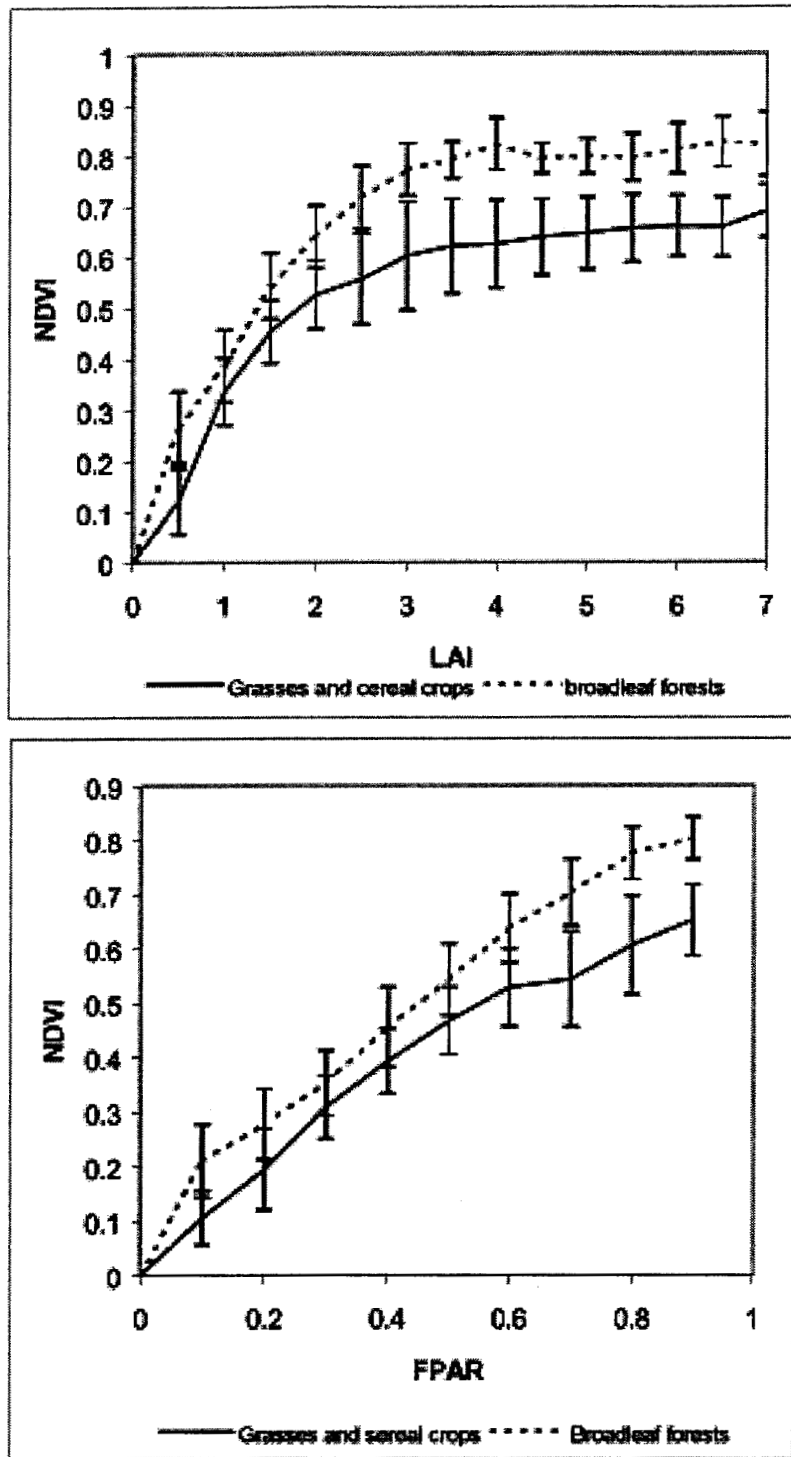
Angular signatures of grasses in the red-NIR (near-infrared) spectral space derived from AirMISR (solid line) and MISR (dotted line) surface directional reflectances acquired over the KONVEX site on July 13, 1999 and July 9, 2000, respectively. Locations of the AirMISR and MISR BHRs are depicted as a triangle and a square.



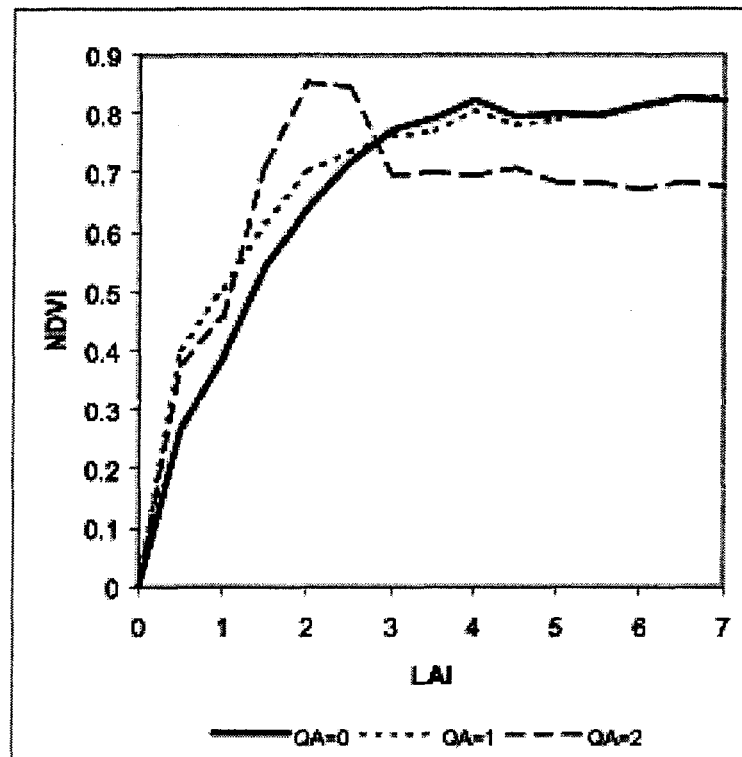
Distribution of pixels from MISR data for the DHR at red and NIR wavelengths for broadleaf forests. The data peak is located at (0.02, 0.36).

The most probable location of MISR DHR in the red-NIR spectral space for different biome types.





NDVI-LAI and NDVI-FPAR regression curves for two biome types (grasses and cereal crops; broadleaf forests). LAI and FPAR fields were derived from MISR surface reflectances and regressed against NDVI computed from MISR nadir view HDRFs.



NDVI-LAI regression curve for broadleaf forests as a function of the Quality indicator of the Algorithm (QA). LAI and FPAR fields were derived from MISR surface reflectances, and then regressed against NDVI, computed from MISR nadir view HDRFs.

102

103

104

105

106

107

108

109

110

111

Browse product image of Path 161, Orbit 007455, centered on Madagascar.

Multi-angle Imaging SpectroRadiometer



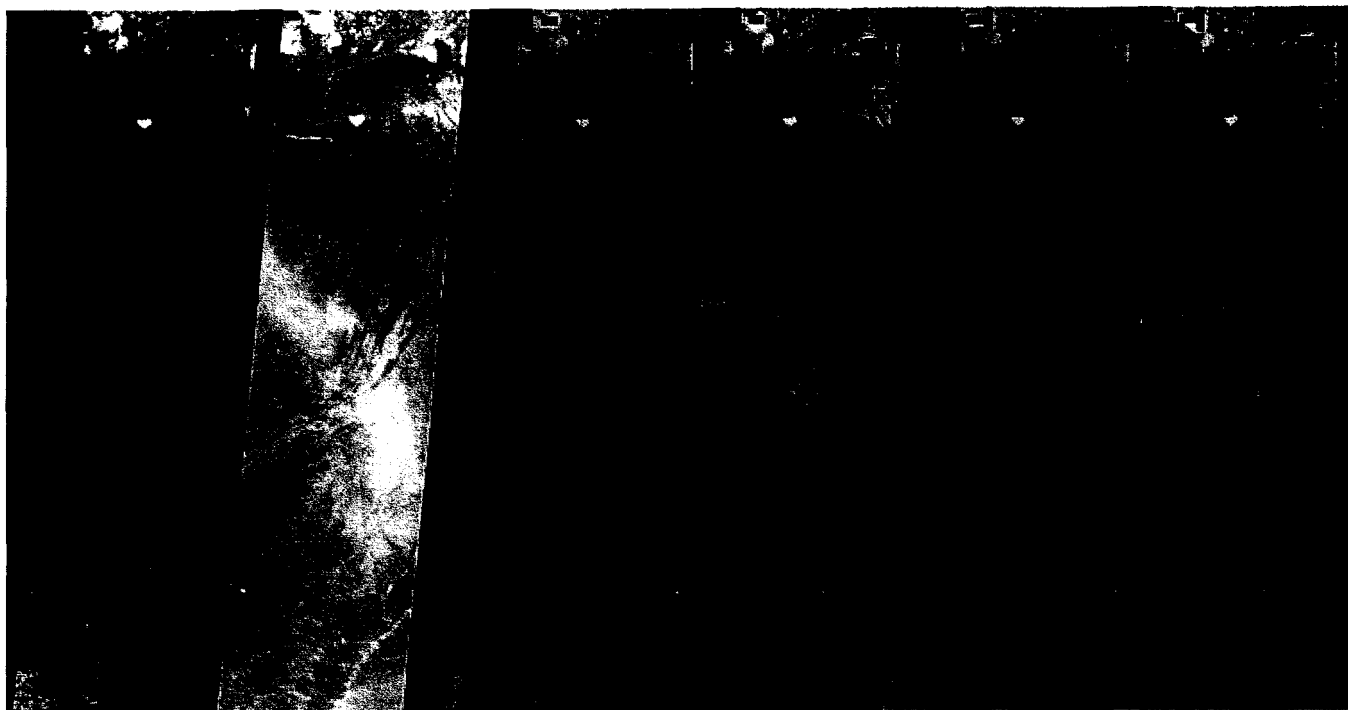
Retrieval of Radiometric and Biophysical Properties of Selected Surface Regions Using MISR Data

John Martonchik, David Diner, Kathleen Crean, Michael Bull,
Yuri Knyazikhin, Jiannan Hu, and Ranga Myneni

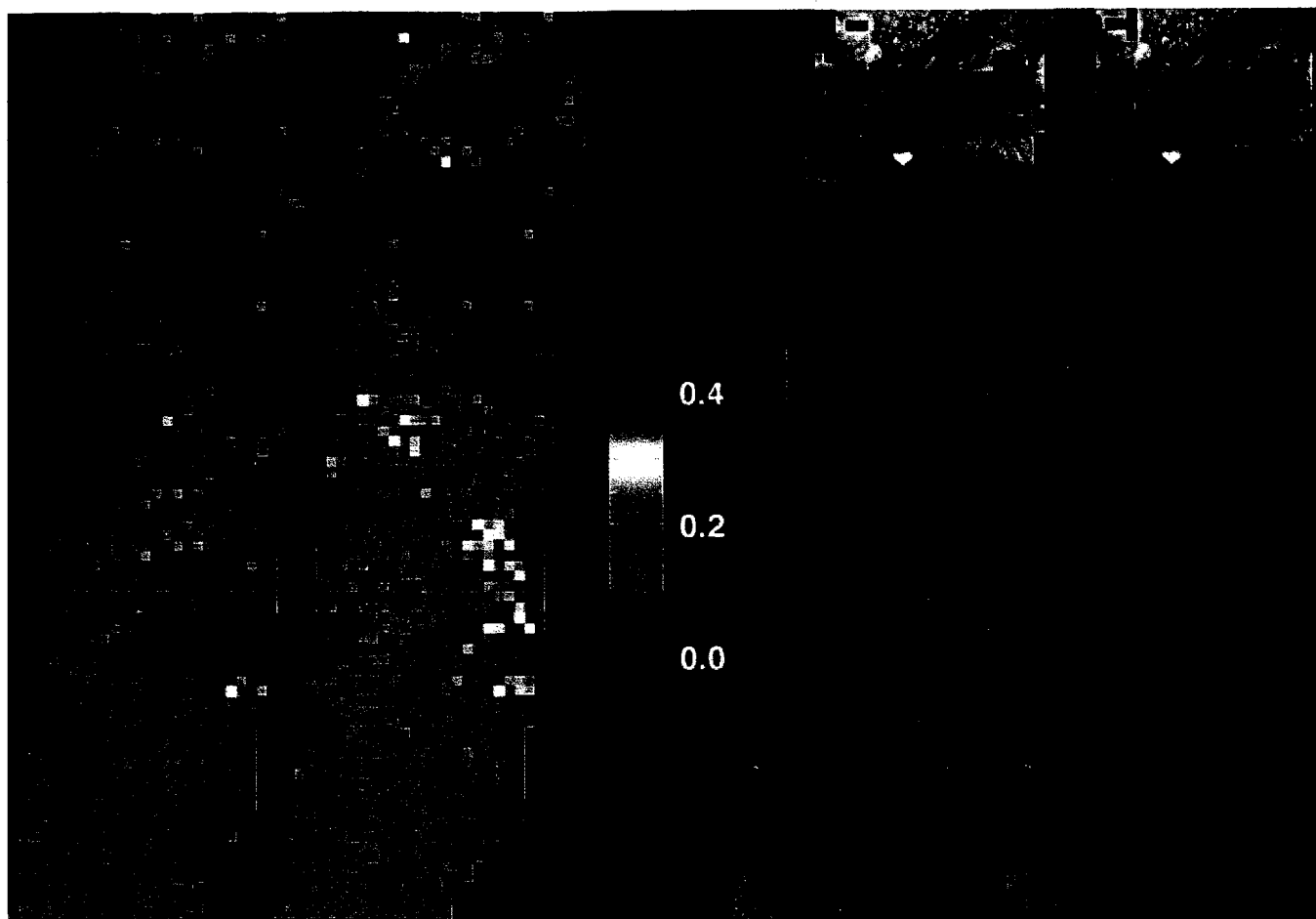
IGARSS, 24-28 June 2002, Toronto Canada



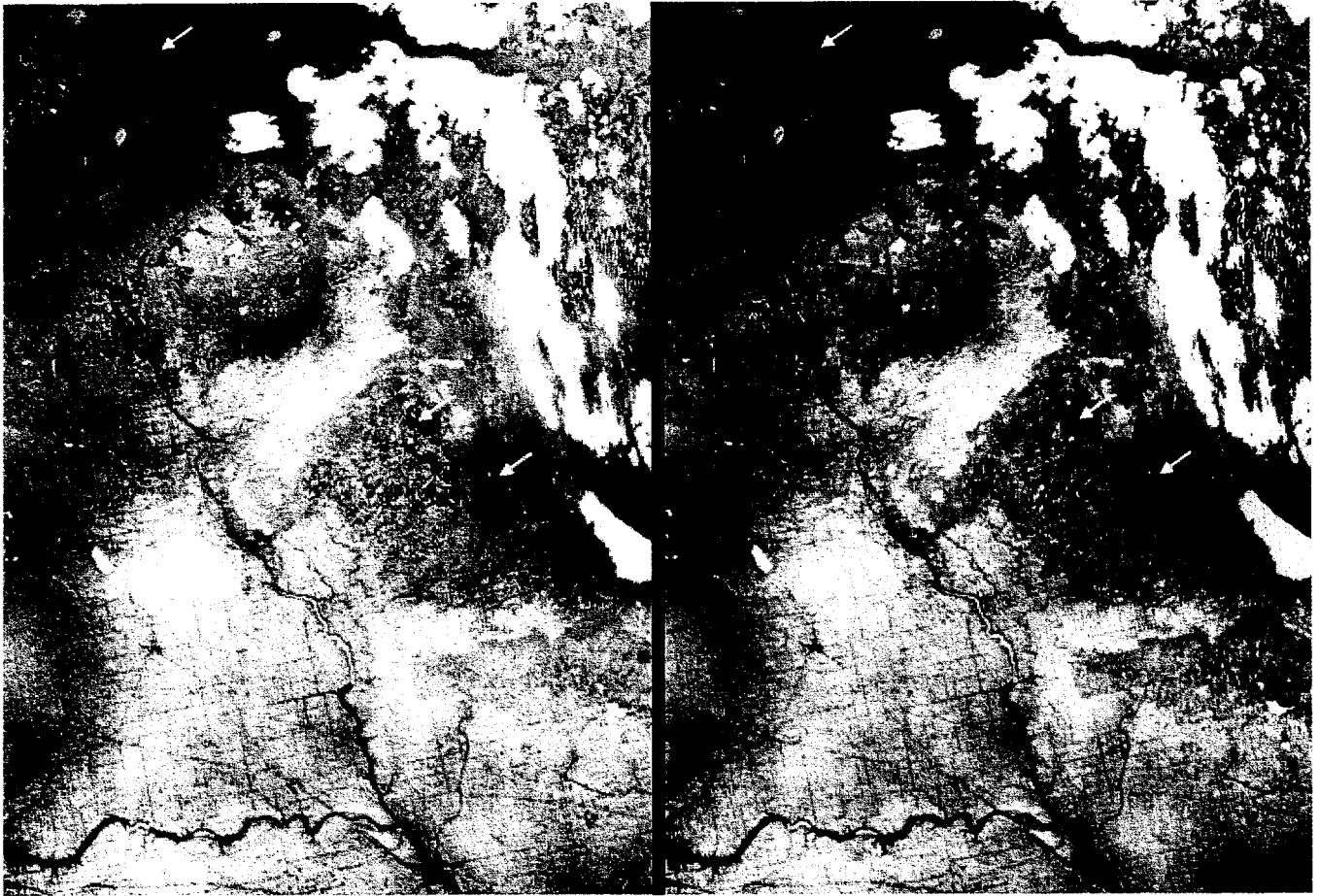
Jet Propulsion Laboratory
California Institute of Technology



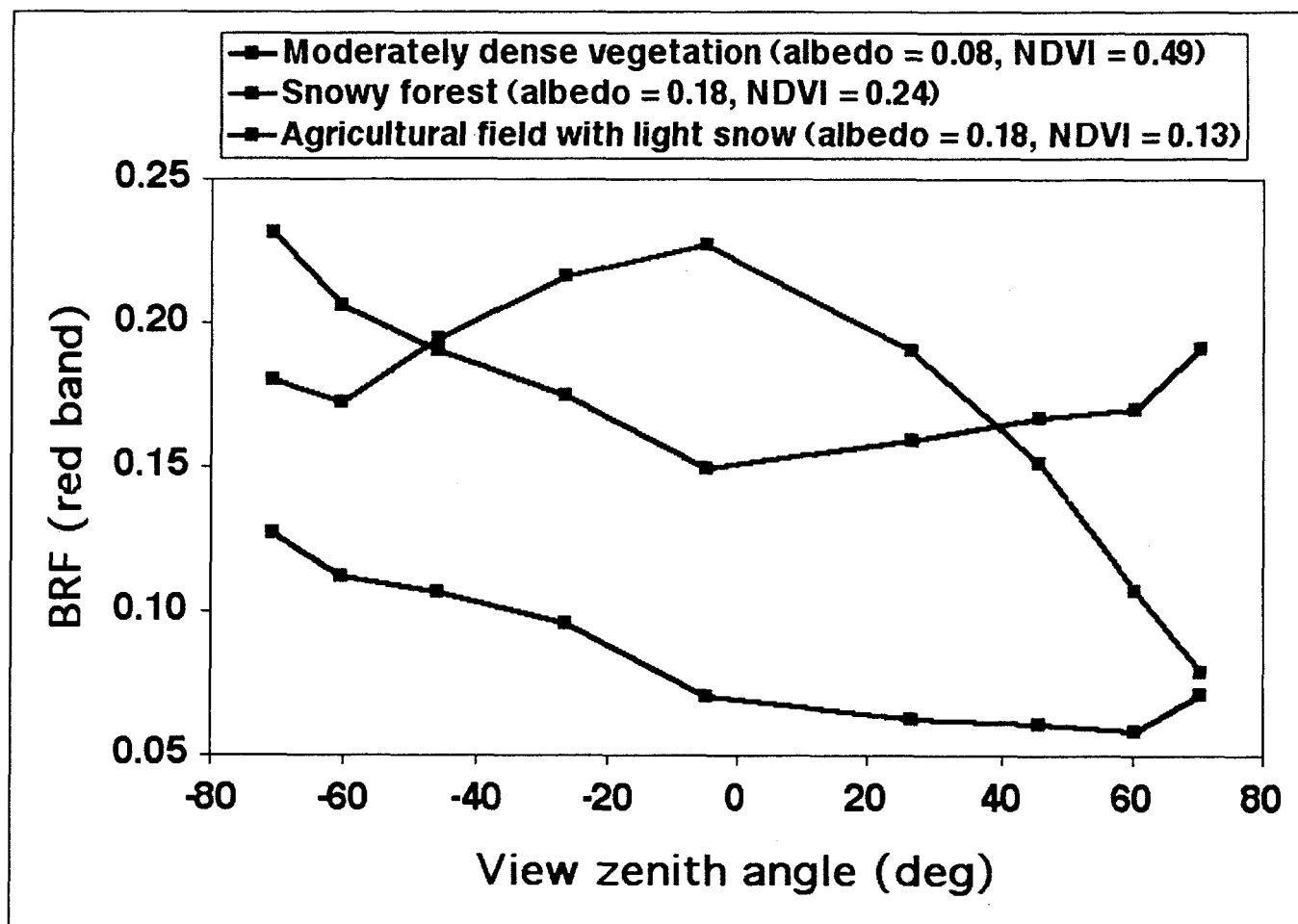
Late winter in eastern USA on 6 March 2000 (Path 17, Orbit 1155). Swath segments shown (from left to right) are: true-color TOA nadir view, TOA 70° forward view, true-color retrieved nadir view HDRF (V2.1.3 s/w), retrieved 70° forward view HDRF (V2.1.3 s/w), nadir view HDRF (V2.1.4 s/w), retrieved 70° forward view HDRF (V2.1.4 s/w).



Swath segment maps associated with Figure 1, show(left to right) are: retrieved aerosol optical depth (V2.1.3 s/w), retrieved aerosol optical depth (V2.1.4 s/w), true-color BHR (V2.1.3 s/w), and BHR (V2.1.4 s/w).



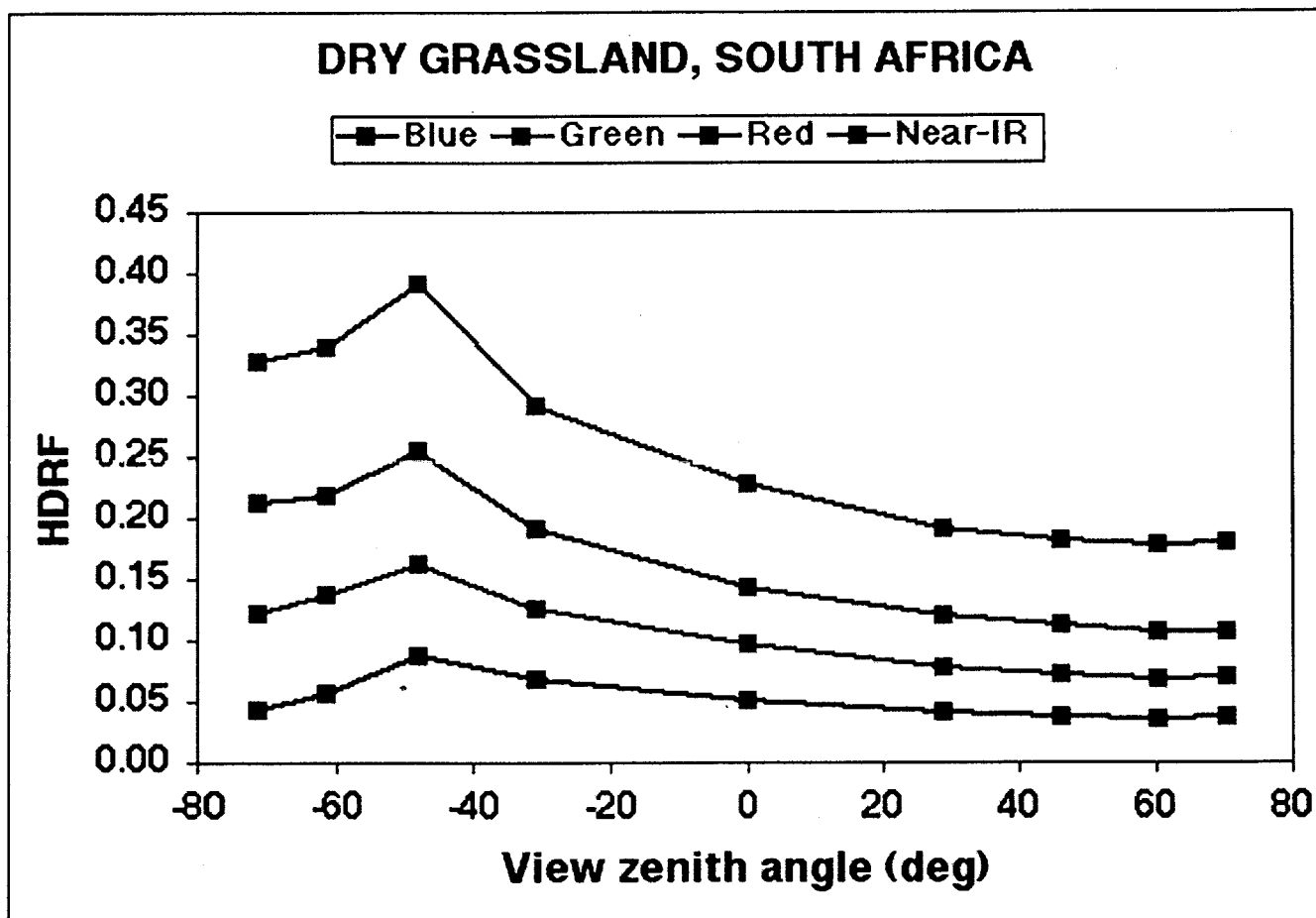
Two false-color images (275 m resolution) of an area (240 km x 175 km) in central Canada on 17 April 2001 (Path 34, Orbit 7083), centered on the Saskatchewan-Manitoba border. The left image is a multispectral composite in which red indicates vegetation. The image on the right is a multiangular composite in which green indicates predominant scattering in the nadir direction.



Angular variation of BRF for the three sites indicated by yellow arrows



True-color mosaic of DHR for southern Africa at 1.1 km resolution. The data were acquired from 14 August to 29 September 2000 during the dry season.



Spectral and angular variation of HDRF for dried grassland on 15 August 2000 (Path 168, Orbit 3509) for a site near Johannesburg. Note the hot spot at the view zenith backscatter angle of 49° , which is also the solar zenith angle.



Map of true color surface HDRF at 1.1 km resolution from the MISR AN camera (view zenith angle over the land area in the range 4-17 deg).

The Sun-camera azimuth angle difference over the land area is in the range 73-114 deg.



Map of true color surface HDRF at 1.1 km resolution from the MISR DA camera (view zenith angle is approximately 70 deg).

The Sun-camera azimuth angle difference over the land area is in the range 6-20 deg.

Compared to the AN camera map, this one shows a prominent "quilting" effect. This effect will always be most dramatic at the largest view zenith angles (D cameras). Outlined on the map in red is a 3 x 3 region area which shows a considerable amount of "quilting".

0.091

0.070

0.089

0.072

0.095

0.113

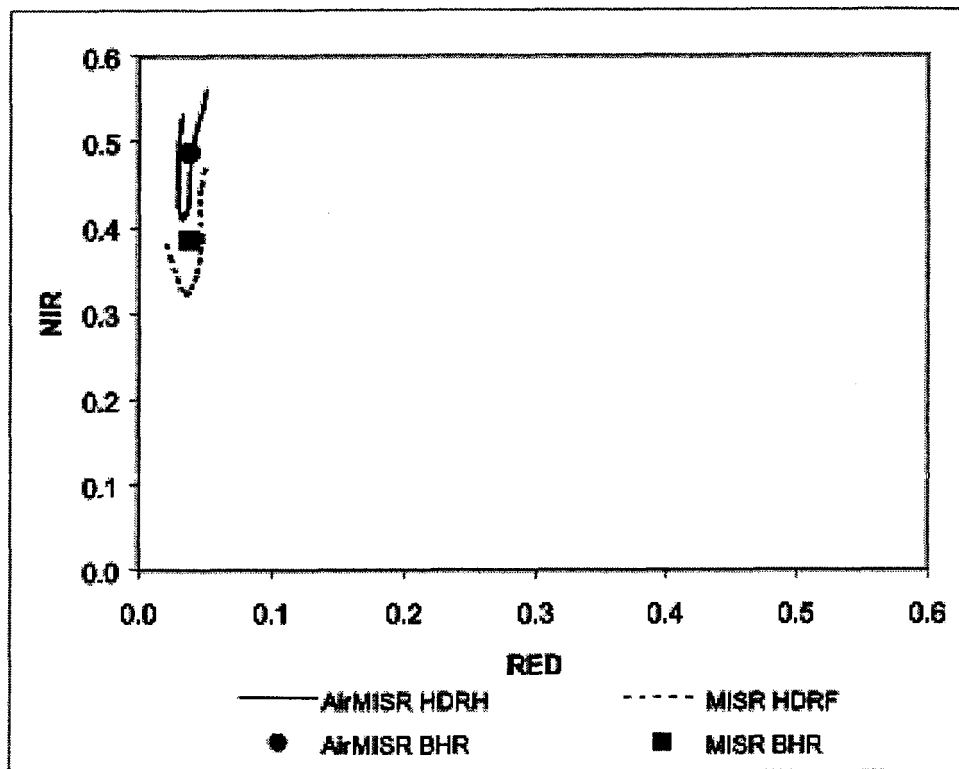
0.089

0.045

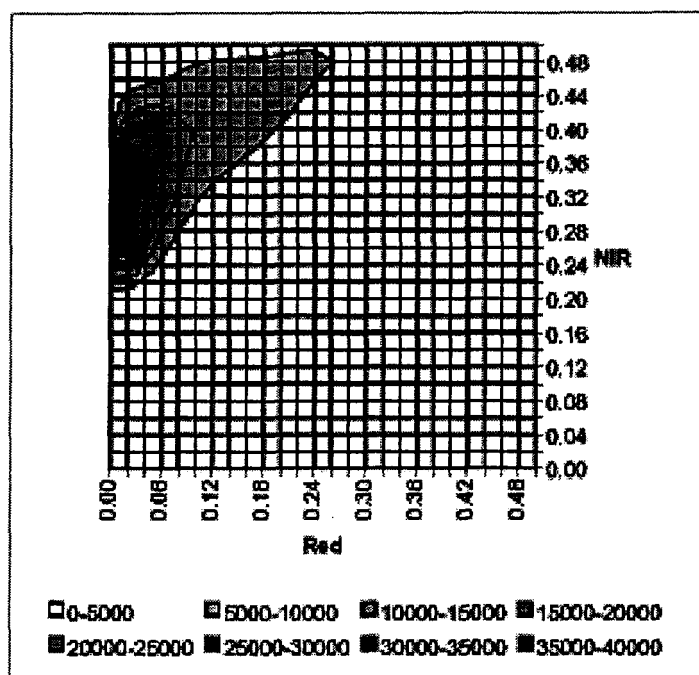
0.095

This 3 x 3 pattern (corresponding to the 3 x 3 region area contained with the red outline of the DA camera HDRF map) displays the retrieved aerosol optical depths (MISR green band) used in the atmospheric correction process to obtain the HDRFs.

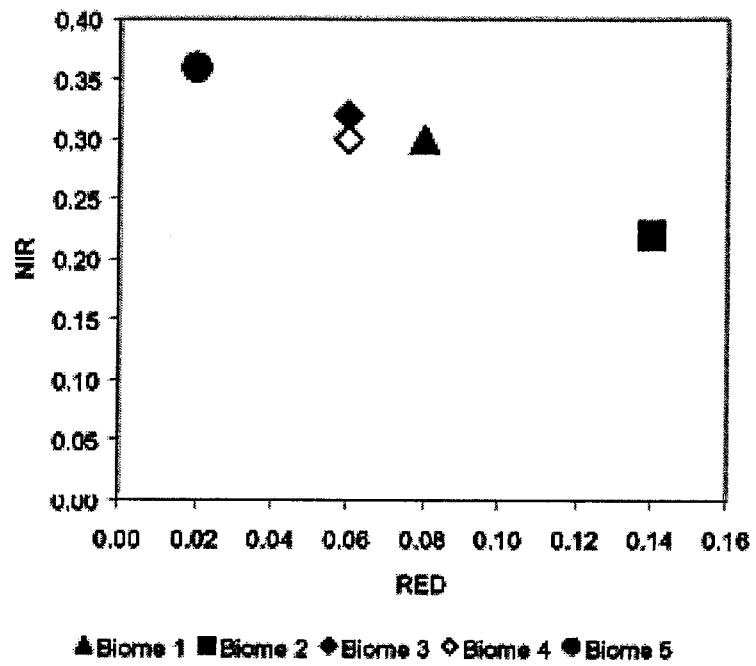
These optical depths have an average and standard deviation of 0.079 ± 0.021 . Nevertheless, the variation is large enough to produce the "quilt" pattern which can be easily seen within the red outline on the DA camera HDRF map.



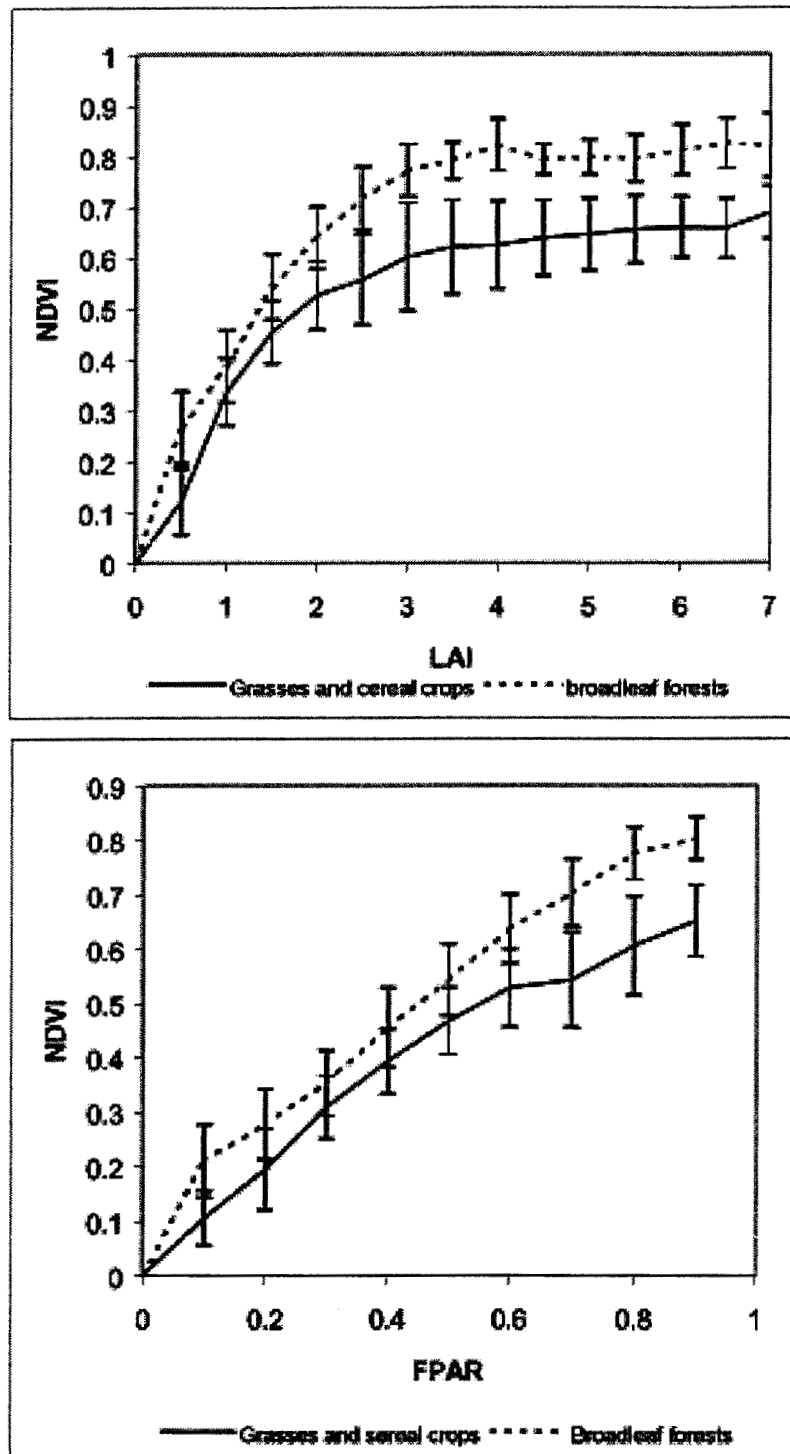
Angular signatures of grasses in the red-NIR (near-infrared) spectral space derived from AirMISR (solid line) and MISR (dotted line) surface directional reflectances acquired over the KONVEX site on July 13, 1999 and July 9, 2000, respectively. Locations of the AirMISR and MISR BHRs are depicted as a triangle and a square.



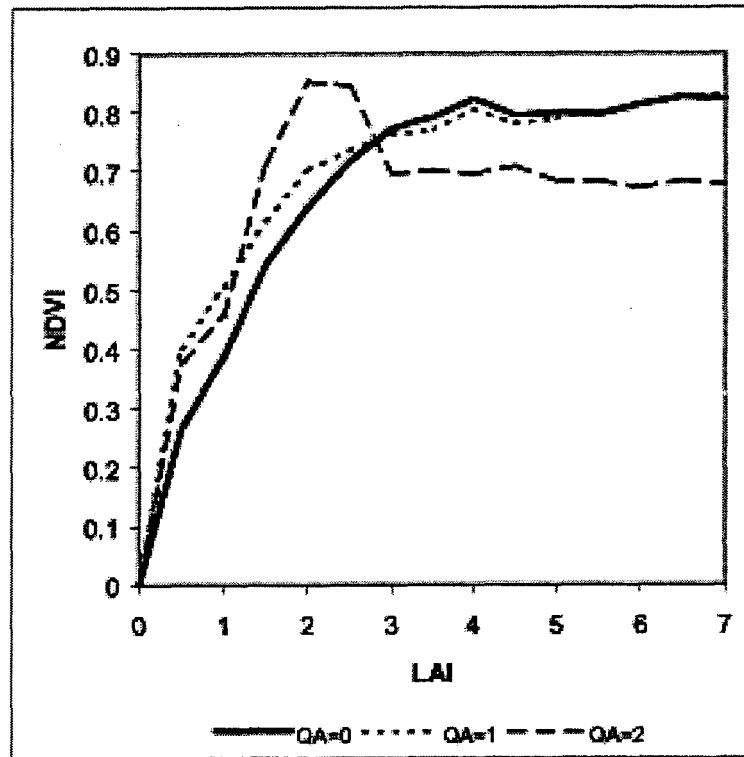
Distribution of pixels from MISR data for the DHR at red and NIR wavelengths for broadleaf forests. The data peak is located at (0.02, 0.36).



The most probable location of MISR DHR in the red-NIR spectral space for different biome types.



NDVI-LAI and NDVI-FPAR regression curves for two biome types (grasses and cereal crops; broadleaf forests). LAI and FPAR fields were derived from MISR surface reflectances and regressed against NDVI computed from MISR nadir view HDRFs.



NDVI-LAI regression curve for broadleaf forests as a function of the Quality indicator of the Algorithm (QA). LAI and FPAR fields were derived from MISR surface reflectances, and then regressed against NDVI, computed from MISR nadir view HDRFs.

102

103

104

105

106

107

108

109

110

111

Browse product image of Path 161, Orbit 007455, centered on Madagascar.